

In re Application of: MALONEK et al.
Serial No.: 09/849,637
Filed: May 4, 2001

Examiner: G.R. Evanisko
Group Art Unit: 3762

In the Claims:

Claims 1 - 18 (CANCELLED)

19. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode is made from a material selected from titanium coated with iridium oxide.

Claim 20 – 40 (CANCELLED)

41. (PREVIOUSLY PRESENTED) A lead as claimed in claim 43, wherein at least one of the at least one signal delivery electrodes is a unitary electrode also adapted for sensing activity of said at least portion of a tissue and providing a signal characteristic of said activity.

42. (CANCELLED)

43. (PREVIOUSLY PRESENTED) A lead for modifying the activity of at least a portion of a tissue, said lead comprising:
at least one signal delivery electrode in the form of a flexible circumferential element positioned around the lead, having a diameter less than 1.5 mm, and having capacitance greater than 300 microfarads and less than 3000 microfarads, wherein the electrode is adapted to withstand chronic delivery to said at least portion of tissue a non-excitatory electric field having an amplitude and duration suitable to modify the contractility of a human cardiac muscle when applied during a refractory period of said muscle; and

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a connector adapted to connect to said at least one signal delivery electrode for enabling said at least one signal delivery electrode to be operatively connected to control circuitry.

44. (CURRENTLY AMENDED) A lead as claimed in claim 43, further comprising control circuitry, wherein the control circuitry is characterized in being adapted for either selectively enabling a non-excitatory electric field to be generated by said at least one signal delivery electrode such as to modify the contractility of a human cardiac muscle when applied during a refractory period of said muscle or for selectively not generating an electric field wherein said electric field is either generated or not generated according to at least one characterizing feature of the signal previously provided by the same or another one of said at least one sensing electrode.

Claims 45 – 73 (CANCELLED)

74. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the distal end of said lead is flexible enough to be mounted on and conform to a cardiac chamber wall.

75. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the external diameter of said lead is smaller than the inner diameter of a human coronary sinus, thereby enabling said lead to pass through said coronary sinus.

76. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the external diameter of said lead is smaller than 1.5 mm.

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77. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the external diameter of said signal deliver electrode is smaller than 1.2 mm.

78. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the external diameter and flexibility of said lead are suitable for insertion through the human coronary sinus reaching branches located on the left ventricle free wall.

79. (CANCELLED)

80. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode is longer than the length of an implantable chronic pacing electrode and shorter than the length of an implantable defibrillation electrode.

81. (CANCELLED)

82. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode is longer than 10 mm and shorter than 40 mm.

83. (CANCELLED)

84. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode has impedance higher than 50 Ohm and lower than 500 Ohm.

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85. (CANCELLED)

86. (PREVIOUSLY PRESENTED) A lead according to claim 43, further comprising:

at least one sensing electrode flanking said at least one signal delivery electrode adapted for sensing the activity of said at least portion of a tissue and providing a signal characteristic of said activity; and

second connector operatively connected to said at least one sensing electrode for enabling said at least one sensing electrode to be operatively connected to a suitable circuitry for determining a stimulus to be applied by said at least one signal delivery electrode.

87. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from titanium coated with titanium nitride.

88. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from platinum iridium coated with iridium oxide.

89. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from platinum iridium coated with titanium nitride.

90. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from platinum iridium coated with sintered platinum.

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91. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from titanium.

92. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from platinum iridium.

93. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from pyrolytic carbon.

94. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein said at least one signal delivery electrode is made from any conductive material approved for chronic use in the body.

95. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode is formed by a coil and wherein the coil is spirally wound around the lead.

96. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the at least one signal delivery electrode is formed by a mesh of wires.

97. (PREVIOUSLY PRESENTED) A lead according to claim 86, wherein the at least one sensing electrode includes pairs of sensing electrodes.

98. (PREVIOUSLY PRESENTED) A lead according to claim 97, wherein a pair of sensing electrodes from the pairs of sensing electrodes is positioned on each side of the at least one signal delivery electrode.

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99. (PREVIOUSLY PRESENTED) A lead according to claim 98, wherein the pairs of sensing electrodes are positioned on the lead in a position so that they can sense a local electrical activity of cardiac muscle under the at least one signal delivery electrode.

100. (PREVIOUSLY PRESENTED) A lead according to claim 43, wherein the lead includes a proximal end and a distal end with a tip, and wherein the tip of the distal end is a soft rounded tip.

101. (CURRENTLY AMENDED) A lead according to claim 43
wherein the at least one signal delivery electrode is further comprises a plurality of signal delivery electrodes, and wherein the plurality of signal delivery electrodes are spaced along the lead such as to occupy a lead length of between about 20 mm and about 150 mm.

102. (PREVIOUSLY PRESENTED) A lead according to claim 101 wherein a distance between adjacent pairs of the electrodes is between about 5 mm to 30 mm.

103. (PREVIOUSLY PRESENTED) A lead according to claim 100 comprising a bend at the distal end, wherein the bend is at an angle between 30 degree to 90 degree.